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(54) A microcontrolled backlit keypad assembly and method for a gaming machine

(57) A keypad assembly and method for use with a gaming machine including a keypad having a plurality of keys to input data, and a plurality of illumination devices operably coupled to a corresponding key for independent

illumination thereof. A microcontroller device is coupled to the plurality of illumination devices for illumination thereof in a manner visually communicating information relating to a game accessible by the gaming machine.

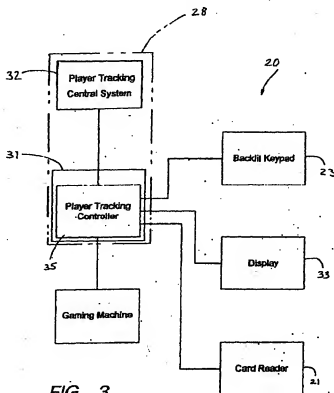


FIG. 3

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TECHNICAL FIELD

[0001] This present invention relates, generally, to player tracking systems for gaming devices and, more particularly, relates to microcontrolled backlit keypad assemblies for player tracking systems.

BACKGROUND ART

[0002] As technology in the gaming industry progresses, the once traditional mechanically-driven reel slot machines have been replaced with electronic counterparts having CRT video displays or the like. These video/electronic gaming advancements enable the operation of more complex gambling games which would not otherwise be possible on mechanical-driven gambling machines. For example, in addition to reel slot machines, it is now common to observe stand alone or multiple platform video electronic games including Keno, Blackjack, Poker, Pai Gow, and all the variations thereof, in even the smallest gaming establishments.

[0003] These electronic game devices are also commonly interconnected to a host computer through a network system. One primary advantage of these networked gaming devices is the ability to collectively track the individual Player use of the gaming devices. Player tracking, for instance, allows the gaming establishment to monitor individual Player use for accounting and advertising purposes. Another benefit derived from these networked systems is the collection of accounting data such as the usage and payout of each gaming machine which allows the gaming establishment to immediately assess their profitability. Typical of such patented systems may be found in U.S. Patent Nos.: 5,470,079 to LeStrange et al.; and 4,283,709 to Lucero et al.

[0004] Generally, each participating Player is issued an individual player tracking card which incorporates a unique player identification code corresponding to the customer's account. Upon insertion of the player tracking card into a card reader at a respective gaming machine, the unique identification code is extracted from the card and transmitted to the host computer to commence tracking of the Player's gaming activity. Subsequently, the host computer updates the customer's account to reflect the new activity. In other systems, the player tracking card may be in the form of a SMART-CARD, a conventional debit card or a credit card which may require the manual input of a PIN or identification code. Such data is typically input through a keypad mechanism located near the card reader or the gaming machine.

[0005] As an incentive to participate in player tracking and/or returning to the gaming establishment, complimentary meals, rooms and event tickets are awarded to the Player based upon their use of the tracking card at the establishment. An example of such systems include

U.S. Patent Nos.: 5,655,961; 5,702,304; 5,741,183; and 5,752,882 to Acres et al.; and 5,761,647 to Boushy. Moreover, such interconnected gaming has several other advantages which include competitive gaming machine play, and additional and more complex bonus schemes which are generally progressive in nature.

[0006] Player participation is typically proportional to the level of the bonus jackpot. That is, the higher the level of the bonus jackpot, the greater the interest garnered in the bonus games. Accordingly, to entice participation, large luminescent display devices which display the level of the bonus are often located above or near the bank of eligible gaming machines. This is especially beneficial in progressive bonus schemes which continuously update the incrementally increasing jackpots.

[0007] While these Player enticement techniques are highly successful in most instances, such displays are not always within the view of the gaming establishment patron. Thus, potential Players which may otherwise be persuaded to participate, if informed, may not participate. Simply increasing the number of luminescent displays is not always feasible due to cost and space considerations. Accordingly, it would be desirable to provide an alternative method to inform potential Players of the current status of the game as an enticement to increase Player participation.

DISCLOSURE OF INVENTION

[0008] The present invention provides a gaming machine communication device for use with a gaming machine. The communication device includes a keypad mechanism having a plurality of keys to input data, and a plurality of illumination devices operably coupled to a corresponding key for independent illumination thereof. A microcontroller device is coupled to the plurality of illumination devices for illumination thereof in a manner visually communicating information relating to a game accessible by the gaming machine.

[0009] Accordingly, the illuminated keys of the keypad mechanism are employed as a means of communicating information to a potential Player preferably pertaining to a current status of the accessible game. For example the pattern, sequence or color of the illuminated keys of the keypad mechanism may indicate to a Player the level or amount of a jackpot.

[0010] In one embodiment, the microcontroller device is configured to independently illuminate each individual illumination device thereof depending upon the state of the current status. The keys, for instance, are preferably translucent for backlighting thereof, and the illumination devices are provided by Light Emitting Diodes (LED). The light emitting diodes are multi-colored LEDs adapted to independently illuminate in one color in a first attract sequence corresponding to a first bonus level of the game, and illuminate in another color in a second attract sequence corresponding to a second bonus level of the game. Alternatively, both colors may be illuminated to

yield a third color which corresponds to a third bonus level.

[0011] In another aspect of the present invention, a keypad assembly is provided for use with a gaming machine to input data. The keypad assembly includes a keypad having a plurality of keys to input data; and a plurality of illumination devices each operably coupled to a corresponding key for independent illumination thereof. Each of the illumination devices are adapted to cooperate with a microcontroller device for independent illumination in a manner visually communicating information relating to the status of a game accessible by the gaming machine.

[0012] In yet another embodiment of the present invention, a gaming system includes a plurality of gaming machines, and a host computer interconnecting the gaming machines for an interconnected bonus game accessible from each gaming machine. The gaming system further includes a plurality of keypad mechanisms coupled to a respective gaming machine. In this configuration, each keypad mechanism includes a plurality of keys to input data, and a plurality of illumination devices each operably coupled to a corresponding key for independent illumination thereof. A microcontroller device is communicably coupled between the respective plurality of illumination devices and the host computer for illumination of the illumination device in a manner visually communicating information relating to the current status of the bonus game.

[0013] In still another aspect of the present invention, a player tracking system is provided for tracking Players of a plurality of gaming machines interconnected to a host computer. The tracking system includes a player tracking device adapted to monitor the game play of a Player, and a keypad assembly having a plurality of keys to input data for use in the player tracking device. A plurality of illumination devices are operably coupled to a corresponding key for independent illumination thereof. The player tracking system further includes a microcontroller device coupled to the plurality of illumination devices for illumination thereof in a manner visually communicating information relating to the current status of a bonus game accessible by the gaming machine.

[0014] A card reader may be provided for reading a player identification card inserted in a card reader opening of the card reader. The keypad may further be arranged in a matrix, which when selectively illuminated, is representative of the state of the jackpot bonus scheme.

[0015] A method may be included in another aspect of the present invention for informing potential Players about a status of a game accessible from a gaming device. The method includes: providing a keypad assembly having a plurality of keys to input data, and a plurality of illumination devices operably coupled to a corresponding key for independent illumination thereof. The method further includes illuminating the illumination devices in a manner visually communicating to a potential

Player the current status of the game accessible by the gaming machine.

[0016] This game may include the games resident on the gaming machine, of the interconnected bonus games which may also be accessed from the gaming machine. The method may further include independently illuminating each individual illumination device thereof depending upon the state of the current status. Before illuminating the illumination devices, the method may include communicating the current status of the game from the host computer to a respective microcontroller of each keypad assembly for illumination of the illuminating devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The method and assembly of the present invention has other objects and features of advantage which will be more readily apparent from the following description of the Best Mode of Carrying Out the Invention and the appended claims, when taken in conjunction with the accompanying drawing, in which:

FIGURE 1 is a top perspective view of a conventional gaming machine incorporating a keypad assembly constructed in accordance with the present invention.

FIGURE 2 is an enlarged top plan view of a keypad of the keypad assembly of FIGURE 1.

FIGURE 3 is a schematic representation of a player tracking system for a gaming machine which incorporates the keypad assembly of the present invention.

FIGURE 4 is a schematic representation of the keypad assembly of the present invention.

FIGURE 5 is a schematic diagram of the keypad assembly of the present invention.

FIGURE 6 is a fragmentary, enlarged side elevation view, in cross-section, of a key component of the keypad assembly taken substantially along the plane of the line 6-6 in FIGURE 2.

FIGURES 7A-7D are a series of top plan views of the keypad assembly of FIGURE 2 illustrating a sequence of illumination patterns corresponding to higher jackpot levels.

BEST MODE OF CARRYING OUT THE INVENTION

[0018] While the present invention will be described with reference to a few specific embodiments, the description is illustrative of the invention and is not to be construed as limiting the invention. Various modifica-

tions to the present invention can be made to the preferred embodiments by those skilled in the art without departing from the true spirit and scope of the invention as defined by the appended claims. It will be noted here that for a better understanding, like components are designated by like reference numerals throughout the various figures.

[0019] Attention is now directed to FIGURES 1-4, and 6 where a gaming machine communication device is illustrated for use with a gaming machine 30. The communication device includes a keypad assembly 20 having a plurality of keys components 25 to input data, and a plurality of illumination devices 26 operably coupled to a corresponding key for independent illumination thereof. A microcontroller device, generally designated 36, is coupled to the plurality of illumination devices 26 for illumination thereof in a manner visually communicating information relating to a game accessible by the gaming machine 30.

[0020] Accordingly, the keypad assembly itself is employed as a visual aid to inform the Player or potential Player about particular information relating to the current status or state of a game accessible from the gaming machine. For example, the luminescent keys of the keypad assembly may be illuminated in a particular sequence or manner to inform the Player about particular details of the bonus jackpot game. Thus, the Player may then be enticed to participate in the bonus game through visual contact with the keypad assembly 20, as opposed to requiring direct viewing contact with the above-indicated large luminescent displays for persuasion.

[0021] In another example of use, the communication device of the present invention may be employed to indicate that a particular machine has recently awarded a jackpot within a predetermined number of plays, to indicate a "hot" machine. For instance, the key components 25 of the keypad assembly 20 may be independently or collectively illuminated in an attract sequence to inform a potential Player that a particular gaming machine is still "hot". In contrast, the key components 25 may be independently or collectively illuminated in another attract sequence in the event that particular gaming machine has not awarded a jackpot within a predetermined number of plays. This may be employed to indicate a machine which has not delivered a jackpot in a while, and is thus ready to award one soon.

[0022] As is apparent from the above examples, the informational keypad assembly of the present invention may be applied to the independent games resident on a particular gaming device, and/or may be applied to the interconnected bonus games through the networked host computer.

[0023] The luminescent keypad assembly 20 of the present invention is particularly suitable for use with a player tracking system 28 which, in the gaming industry, is typically employed for tracking Players of a plurality of gaming machines 30. Briefly, as shown in the schematic diagram of FIGURE 3, each gaming machine 30

is electrically interfaced to a central player tracking or host system computer 32 through a respective a player tracking module 31. The player tracking system 28 further includes card reader 21, keypad assembly 20 and a display device 33 which collectively allow the Player to interface with the system computer 32. Once the Player's identification is verified by either manual input of their PIN code, or through an issued player identification card 22 which itself incorporates a unique personal identification code, the keypad assembly 20 of the present invention will allow the player tracking module 31 to obtain information from the Player through key component presses and to assess the validation of the particular information through the visualization of the backlit key components 25.

[0024] Briefly, it will be understood that the details of the circuitry and electronics of the present invention, such as the microcontrollers, the application software, and the like, may be resident in any one of the keypad assemblies 23, the host system computer 32, the gaming machine itself, or a combination thereof. However, for clarity and the ease of description, the present invention is primarily described in reference to the embodiment having the majority of the componentry resident in the keypad assembly. Most of this componentry, however, may be adaptable for application with the system computer or the gaming machine with minimal design change.

[0025] FIGURE 3 illustrates that the player tracking module 31 further includes a player tracking controller unit 35 which generally performs the functions of communicating with the gaming machine, communicating with the system, verifying the card was read correctly, writing data to display. Operably coupled to this unit 35 is the keypad assembly 20 of the present invention which enables the Player to interface with the other components of the player tracking system 28 such as the card reader 21 and the host system computer 32. The keypad assembly 20 includes an onboard microcontroller 36 which provides all scanning and decoding functions of the keypad component matrix, as well as control of the visual feedback of the individual keys. This microcontroller 36 further operates to interface the player tracking controller unit 35 with the keypad assembly 23 through a clocked serial interface (FIGURES 3 and 4). Thus, the keypad assembly 20 of the present invention is adaptable to interface with existing player tracking controller units through clocked serial connections, or with new versions of the player tracking controller units through ASYNC serial communications and I²C serial communications.

[0026] Referring back to FIGURE 2, the keypad assembly 23 preferably includes sixteen (16) key components aligned in a 4x4 matrix. It will be appreciated, of course, that a larger or smaller matrix may be employed. Preferably, keypad includes ten (10) conventional number key components 25', a "cocktail" key component 25" and an "attendant" key component 25". Four

(4) programmable "function" key components 25 may be included for optional functions and features such as the inquiry of information relating to jackpot bonus games, player tracking information or the like. Alternatively, the "cocktail" key component 25 and the "attendant" key component 25 can be replaced by the more conventional "*" and "#" symbols.

[0027] During conventional data input use, the key components 25 may be configured to illuminate and/or flash when pressed and/or not pressed, such as when the Player's Personal Identification Number (PIN) is being keyed-in through the keypad assembly 23. Briefly, and as shown in an exemplary schematic diagram of the keypad assembly 23 in FIGURE 5, the columns of the keypad matrix are scanned by embedded software and the row inputs are read in and decoded. Column selection is performed by the use of two bits from port RA (RA0 and RA1). These output ports are connected to one half of a 74HC139 2-to-4 decoder. As a binary pattern is presented to the input of the 74HC139, one of the 4 outputs is driven low. This is the select for a column. As viewed in the schematic diagram, port RB0 - RB3 are all tied to V_{cc} with a 10K resistor to assert a logic true condition until a key component 25 is pressed. When a particular key component 25 is pressed, the corresponding row is sunk to ground which causes a zero (0) to be read on the corresponding pin of port RB (RB0-RB3). Each of the column sinks is isolated with a diode, allowing any two key components 25 to be depressed simultaneously with full identification by the microcontroller 36. Should any more than two key components be depressed simultaneously, an invalid input will be yielded and should be rejected as invalid input.

[0028] The illumination devices 26, preferably Light Emitting Diodes (LED), are driven through a similar column selection as that of the keypad components. As viewed in FIGURE 5, two bits of RA are used to control the other half of the 74HC139 decoder (RA2 and RA3). The output of the decoder is connected to a current sink. During reset conditions, the 74HC139 decoder is disabled to guarantee that a column of LEDs is not selected when the processor is not active. Port D (RD0-RD7) is used to drive the column source drivers for the LEDs, which therefore requires the LEDs to be multiplexed. The outputs of RD are connected to the red and green LED drive signals as follows:

RD0 = Row 0 red
RD1 = Row 0 green
RD2 = Row 1 red
RD3 = Row 1 green
RD4 = Row 2 red
RD5 = Row 2 green
RD6 = Row 3 red
RD7 = Row 3 green

[0029] To provide the desired visual feedback function, each key component 25 is backlit by a respective

illumination device 26 which is operably connected to the microcontroller 36 of the validation device 27 for on/off operation thereof. As best viewed in the cross-section of FIGURE 6, each key component 25 preferably includes a flexible translucent or transparent cover 37, such as silicone rubber or the like, which is formed to house the illumination device 26 therein. Upon illumination, the light generated by the illumination device 26 radiates out of the top of the cylindrical column and through the translucent cover 37 to provide the backlight visual illumination.

[0030] In the preferred embodiment, each illumination device 26 is provided by a conventional Light Emitting Diode (LED). Advantageously, these LEDs reduce power consumption and generate substantially less heat than incandescent lights. Moreover, LEDs have a longer life span, and require less maintenance as well. Preferably, these LEDs are tri-color-type LEDs capable of illumination in red, green or yellow. Other colors may be employed, however. Additionally, since each multi-color LED is individually addressable, the 4x4 matrix may be illuminated in predetermined patterns; as well as multiple color schemes.

[0031] Using a set of animation tables residing in the ROM, the individually addressable LEDs can be collectively flashed or illuminated in a patterned or colored attract sequence which corresponds to a particular status of a game. Depending upon the current status or state of a game, the central host computer 32 or the player tracking controller 35 may communicate with each microcontroller 36 of each keypad assembly 20 to send instructions about which animation mode to display. Such an attract sequence may be automatically activated during non-use of the keypad or when the card reader is in non-use. Upon detection of use of a key component closure or insertion of an identification card, the microcontroller 36 can abort the attract sequence. Additionally, more than one animation mode may be included depending upon the circumstance, such as during bonus play.

[0032] The communication device 10, therefore, utilizes these attract sequences to animate the keypad components 25 when the keypad assembly 20 is not in use. These attract sequences are employed as a means to visually communicate information relating to the status or state of the games accessible at the gaming machine 30 (i.e., the games internally resident on the gaming machine and/or the bonus game accessible through the host computer). In this manner, at least one or a plurality of key components 25 can be illuminated upon the occurrence of a predetermined event. For example, upon the occurrence of a first event, such as the jackpot reaching or surpassing a first bonus level, the key components 25 may be illuminated in a first attract sequence and color scheme simulating a thermometer or the like (E.g., flash or illuminate the key components 25 in "yellow"). Upon the level of the jackpot increasing and surpassing a second bonus level, a second attract se-

quence may commence to change colors, and/or patterns (E.g., flash or illuminate the key components 25 in "red").

[0033] As shown in the attract sequences of FIGURES 7A to 7D, the jackpot amounts may be expressed by flashing or illuminating the entire row of key components 25 either individually, simultaneously or in the same or different colors, or sequentially illuminate the key components from left to right or right to left. By way of example, as shown in FIGURE 7A, a relatively small jackpot amount (a minimum first bonus level) may be expressed (the first attract sequence) by simultaneously illuminating the entire bottom row 38 of key components 25 (i.e., the "F4", "cocktail" "0" and "attendant" key components). As the jackpot incrementally increases in value, upon surpassing or reaching a second bonus level, a second attract sequence may commence. As shown in FIGURE 7B, for instance, a second row 40 of key components 25 may be simultaneously illuminated (i.e., the "F3", "7", "8" and "9" key components) to indicate a lower middle range of jackpots.

[0034] Referring now to FIGURES 7C and 7D, once the jackpot incrementally surpasses or reaches a third and fourth bonus level, a third attract sequence and a fourth attract sequence may commence, respectively. Similar to the first and second attract sequences, the third and fourth attract sequences may include simultaneously illuminating the third row 41 (i.e., the "F2", "4", "5" and "6" key components) and the fourth row 42 (i.e., the "F1", "1", "2" and "3" key components) to indicate an upper middle range and top range of jackpots, respectively. Moreover, the third and fourth attract sequences may include different color schemes, such as in the color "red", while the first and second attract sequences may be in the colors "green" and "yellow", respectively. The fourth attract sequence, for example, may also include a composite or sequential pattern of illumination sequences from the first attract sequence (FIGURE 7A) through the fourth attract sequence (FIGURE 7D). In addition, this sequential pattern may change colors to simulate a thermometer reaching a higher level (E.g., "red").

[0035] In another example, the individual key components 25 may sequentially illuminate from left-to-right and/or from right-to-left starting at the bottom row 38 and ending at any key component 25 at either the second row 40, the third row 41 or the top row 42, depending upon the level of the jackpot. Multiple color schemes may be applied as well.

[0036] Incorporated in the keypad assembly 20 is software which performs the following functions for the keypad assembly 23. These functions include receive commands from and send key press information to the player tracking controller unit 35. Moreover, the keypad software further functions to acknowledge receipt of commands from the player tracking controller, decode and debounce key switch activation, and process commands received from the player tracking controller unit 35.

[0037] The control of all back lighting of keypad assembly 23, as executed by the microcontroller 36, is further operated by the keypad software. Briefly, each key component 25 can be lit when released and/or lit when pressed, and/or each key can be flashing when released and/or flashing when pressed. The keypad software further includes the set of the above-mentioned attract sequences which animate the key colors when the keypad is not in use. Attract sequences can be selected using the command language.

[0038] More specifically, in accordance with the attributes and subroutines, an attribute table resides in on-chip RAM which comprises 16 attribute bytes, each of which includes a 16-byte array residing in on-chip RAM which comprises 16 attribute bytes, each of which corresponds to one key component 25. The respective attribute byte for a key component determines whether the LED is illuminated when pressed, not illuminated when not pressed, the color of illumination if lit, and whether the respective LED is flashed when pressed and/or not pressed.

[0039] At a command interface, the commands are received from the host computer 32 via a clocked serial interface. Preferably, this is at rate of 9600 baud, but may vary in accordance with the state of the field. These commands include a define keypad attributes command, an attract mode command and a stop attract mode command. Each command is composed of an address (wake-up bit set) byte; a command code byte; a length of command byte, including address, command code, length byte, all data and both CRC bytes; an optional data byte; a CRC low byte; and a CRC high byte. Furthermore, each byte of a command consists of a start bit, 8 data bits, a 9th bit called the wake-up bit, and a stop bit.

[0040] In a Keypad Status Reporting routine, whenever a key component 25 is pressed, an ASCII code corresponding to the key component is sent to the host system computer 32. If a command is being received from the host computer system when the key component is pressed, the ASCII code is not sent until command reception is completed. The keypad status reporting is handled by a main loop code, to be discussed below. A single-byte buffer will contain a key code if the interrupt service routine has detected a key closure. Another subroutine NEWK determines if the key closure is that of a new key component. In the event that the key closure is a new key, a subroutine ASCTRANS is called to send the ASCII code to the host system computer 32. The single-byte buffer is then set to zero to indicate that it is ready to handle another key component.

[0041] During an initialization routine after a power-up, a subroutine INIT_PIC commences to perform three initialization functions. These functions include the programming and initialization of the I/O ports, and the programming of a timer to overflow every 10 milliseconds. Finally, the attribute table is initialized with default keypad attributes such as: off when the key component is

not pressed; and a solid yellow illumination of the LEDs when a corresponding key component is pressed.

[0042] After initialization is complete, the main loop code accesses two subroutines. A CK_BUFFER subroutine checks if a new key component has been pressed. A SENDKEY subroutine is then accessed to send the ASCII code to the host system computer. Secondly, a CK_COMMAND subroutine checks for a start bit from the host computer system. Should the start bit be detected, this subroutine subsequently receives a byte from the host computer system. If the byte received is the last byte of a command, the CK_COMMAND subroutine interprets and executes the command.

[0043] Timer 0 is configured to continuously interrupt the microcontroller 36 at 10 ms intervals. During each interrupt, the keypad assembly 23 is scanned, and any backlighting is commenced or refreshed. Further tasks are preferably performed at this time include flash timing, and an attract mode animation, which are discussed henceforth.

[0044] During keypad scanning, each column of the keypad assembly 23 is scanned at 10 millisecond intervals by the Timer 0 interrupt service routine. A variable contains the column number currently being scanned, and is incremented at each timer 0 interrupt. The column number is used to enable a key column via the microcontroller output Port A. Key closures are then detected by reading the microcontroller input port B. When a key component 25 closure is detected, its code is stored in the single-byte key buffer, but only if the single-byte key buffer is 0. In the event the single-byte key buffer already contains a key code, this code will not be overwritten. The main loop code will translate the key code into an ASCII code and send it to the host system computer 32. As previously described, single-byte key buffer is then set to zero which indicates to the Interrupt service routine that another key code can be sent.

[0045] Immediately after the keypad scan, backlighting of the corresponding keypad LEDs commences in the key column being scanned. The keypad attributes are fetched from the attribute array and the LEDs are programmed with the appropriate color depending on whether a key component is pressed or not. If the key attribute indicates flashing, and the flasher bit is "OFF", the corresponding LED is turned off.

[0046] As above-indicated, flash timing of the keypad assembly commences during each interrupt interval. A subroutine BLINK is accessed which complements all the flasher bits in the keypad attribute table. This is preferably performed about every 116th interval, which yields a flash interval of about 1.2 seconds. Another predetermined number of intervals may be employed of course.

[0047] In an attract mode, the key component LEDs are animated using a set of animation tables which reside in code ROM. Each frame of the animation sequence consists of four (4) bytes. Each byte contains the 2-bit color code for four (4) key lights. The frames

are preferably advanced every thirty-two (32) Timer 0 interrupt periods for an animation speed of 320 ms per frame.

[0048] To determine which animation table to use, depending upon the gaming event or occurrence, an animation mode is downloaded from the central host computer 32 or the player tracking controller 35 to the keypad microcontroller 36. A subroutine ANIMATE is preferably called every twenty-one (21) timer 0 interrupt periods to advance the frame. The ANIMATE subroutine retrieves the next frame from the animation table and employs this data to override the keypad attributes. Upon detection of a key component closure, the attract mode is aborted.

[0049] In accordance with another aspect of the present invention, a method is provided for informing potential Players about a status of a game accessible from a gaming device 30 including providing a keypad assembly 20 positioned proximate to or on the gaming device 30. The keypad assembly 20 includes a plurality of keys 25 to input data, and a plurality of illumination devices 26 operably coupled to a corresponding key 25 for independent illumination thereof. The method further includes illuminating the illumination devices 26 in a manner visually communicating to a potential Player the current status of the game accessible by the gaming device 30.

[0050] The method preferably includes the step of independently illuminating each individual illumination device 26 thereof depending upon the state of the current status. This is performed by illuminating a respective LED in one color in a first attract sequence corresponding to a first bonus level of the game, and illuminating the respective LED in another color in a second attract sequence corresponding to a second bonus level of the game.

[0051] In yet another aspect of the present invention, a method is provided for attracting potential Players to participate in a networked gaming system including: providing a plurality of gaming devices 30 interconnected through a host computer 32 interconnecting the gaming devices 30 for access to an interconnected game from each gaming device 30, and providing a plurality of keypad assemblies 23 coupled to a corresponding gaming device 30. Each keypad assembly 20 includes a plurality of keys 25 to input data, and a plurality of illumination devices 26 operably coupled to a corresponding key for independent illumination thereof. The method further includes illuminating the illumination devices 26 in a manner visually communicating to a potential Player the current status of the game accessible by the gaming device 30.

[0052] In the preferred embodiment, before illuminating the illumination devices 26, the present invention includes communicating the current status of the game from the host computer 32 to a respective microcontroller 36 of each keypad assembly 20 for illumination of the illumination devices 26.

[0053] Although the foregoing invention has been described in some detail for purposes of clarity of understanding, it will be apparent that certain changes and modifications may be practiced within the scope of the appended claims. For instance, although the specification has described a keypad assembly and card reader on gaming machines, such interface may be used on other casino stations as well. For example, a pad assembly of the type described above may also be used with blackjack or craps tables. Further, the systems of this invention are not limited to conventional casino gaming machines and stations, but may include other machines such as amusement machines, televisions, vending machines, etc. In addition, the reader will understand that the terminals as describe herein can be with gaming machines that are not necessarily located in a casino or connected to a LAN. Thus, in some embodiments, the gaming machines incorporating the keypad assembly of this invention may be stand-alone machines located in bars, drug stores, or other establishments.

Claims

1. A gaming machine communication device for use with a gaming machine comprising:
 - a keypad assembly having a plurality of keys to input data;
 - a plurality of illumination devices each operably coupled to a corresponding key for independent illumination thereof; and
 - a microcontroller device coupled to said plurality of illumination devices for illumination thereof in a manner visually communicating information relating to a game accessible by said gaming machine.
2. The communication device as defined in claim 1, wherein
 - the game information includes a current status of said game.
3. The communication device as defined in claim 2, wherein
 - said current status of said game includes a bonus level of said game.
4. The communication device as defined in claim 2, wherein
 - said microcontroller device is configured to independently illuminate each individual illumination device thereof depending upon the state of the current status.
5. The communication device as defined in claim 4, wherein
 - said keys are translucent for back lighting thereof, and said illumination devices are provided by Light Emitting Diodes (LED).
6. The communication device as defined in claim 5, wherein
 - said light emitting diodes are multi-color LEDs adapted to independently illuminate in one color in a first attract sequence corresponding to a first bonus level of the game, and illuminate in another color in a second attract sequence corresponding to a second bonus level of the game.
7. The communication device as defined in claim 6, wherein
 - said light emitting diodes are further adapted to independently illuminate in a third color in a third attract sequence corresponding to a third bonus level of the game.
8. The communication device as defined in claim 1, wherein
 - said microcontroller device is configured to independently illuminate each individual illumination device thereof.
9. The communication device as defined in claim 8, wherein
 - said illumination devices include multi-color Light Emitting Diodes (LED) adapted to visually communicate the game information.
10. The communication device as defined in claim 9, wherein
 - said key components of the keypad assembly are arranged in a matrix, and
 - said microcontroller device is adapted to independently illuminate each LED in a first attract sequence corresponding to a first gaming status of the game, and a second attract sequence corresponding to a second gaming status of the game.
11. The communication device as defined in claim 1, wherein,
 - said microcontroller further includes an attract mode which independently operates each illumination device in an attract sequence corresponding to a bonus level of said game.
12. The communication device as defined in claim 11, wherein
 - said illumination devices include multi-color Light Emitting Diodes (LED) adapted to independently illuminate each LED in a first attract sequence corresponding to a first bonus level of the game, and a second attract sequence corresponding to a

second bonus level of the game.

13. The communication device as defined in claim 1, wherein said microcontroller is resident on the keypad assembly.

14. A keypad assembly for use with a gaming machine to input data comprising:

a keypad having a plurality of keys to input data; and
a plurality of illumination devices each operably coupled to a corresponding key for independent illumination thereof, each said illumination device being adapted to cooperate with a microcontroller device for independent illumination thereof in a manner visually communicating information relating to the status of a game accessible by said gaming machine.

15. The key assembly as defined in claim 14, wherein said current status of said game includes a bonus level of said game.

16. The key assembly as defined in claim 14, wherein said keys are translucent for back lighting thereof, and said illumination devices are provided by Light Emitting Diodes (LED).

17. The key assembly as defined in claim 16, wherein said LEDs are multi-color LEDs illuminating one color in a first attract sequence corresponding to a first gaming status of the game and another color in a second attract sequence corresponding to a first gaming status of the game.

18. The key assembly as defined in claim 17, wherein said key components of the keypad are arranged in a matrix, and said each said LED is adapted to independently illuminate in one attract sequence corresponding to a first gaming status of the game, and a second attract sequence corresponding to a second gaming status of the game.

19. The key assembly as defined in claim 18, wherein, said first gaming status corresponds to a first bonus level of the game, and said second gaming status corresponds to a second bonus level of the game.

20. A gaming system comprising:

a plurality of gaming machines;
a host computer interconnecting said gaming machines for an interconnected bonus game accessible from each gaming machine;

a plurality of keypad assemblies coupled to a respective gaming machine, each said keypad assembly having a plurality of keys to input data, a plurality of illumination devices each operably coupled to a corresponding key for independent illumination thereof; and a microcontroller device communicably coupled between the respective plurality of illumination devices and the host computer for illumination of the illumination device in a manner visually communicating information relating to the current status of the bonus game.

21. The gaming system as defined in claim 20, wherein said current status of said game includes a bonus level of said bonus game.

22. The gaming system as defined in claim 21, wherein each said microcontroller device is configured to independently illuminate each individual illumination device thereof depending upon the state of the bonus level.

23. The gaming system as defined in claim 22, wherein said illumination devices are multi-color Light Emitting Diodes (LED), adapted to independently illuminate in one color in a first attract sequence corresponding to a first bonus level of the game, and illuminate in another color in a second attract sequence corresponding to a second bonus level of the game.

24. The gaming system as defined in claim 23, wherein each said microcontroller is adapted to download the attract sequences from the host computer.

25. A player tracking system for tracking Players of a plurality of gaming machines interconnected to a host computer comprising:

a player tracking device adapted to monitor the game play of a Player;
a keypad assembly having a plurality of keys to input data for use in the player tracking device; a plurality of illumination devices each operably coupled to a corresponding key for independent illumination thereof; and
a microcontroller device coupled to said plurality of illumination devices for illumination thereof in a manner visually communicating information relating to the current status of a bonus game accessible by said gaming machine.

26. The player tracking system as defined in claim 25, further including:

a card reader for reading a player identification card inserted in a card reader opening of the card reader.

27. The player tracking system as defined in claim 26, wherein
said current status of said game includes a bonus level of said bonus game.
28. The player tracking system as defined in claim 27, wherein
said microcontroller device is configured to independently illuminate each individual illumination device thereof depending upon the state of the bonus level.
29. The player tracking system as defined in claim 28, wherein
said keys are translucent for back lighting thereof, and said illumination devices are provided by Light Emitting Diodes (LED).
30. The player tracking system as defined in claim 29, wherein
said light emitting diodes are multi-color LEDs adapted to independently illuminate in one color in a first attract sequence corresponding to a first bonus level of the game, and illuminate in another color in a second attract sequence corresponding to a second bonus level of the game.
31. The player tracking system as defined in claim 30, wherein
said light emitting diodes are further adapted to independently illuminate in a third color in a third attract sequence corresponding to a third bonus level of the game.
32. The player tracking system as defined in claim 31, wherein
said key components of the keypad assembly are arranged in a matrix.
33. A method of informing potential Players about a status of a game accessible from a gaming device comprising:
providing a keypad assembly, proximate the gaming device, having a plurality of keys to input data, and a plurality of illumination devices operably coupled to a corresponding key for independent illumination thereof; and
illuminating the illumination devices in a manner visually communicating to a potential Player the current status of the game accessible by said gaming device.
34. The method as defined in claim 33, wherein
said current status of said game includes a bonus level of said game.
35. The method as defined in claim 33, further including:

ing:
independently illuminating each individual illumination device thereof depending upon the state of the current status.

36. The method as defined in claim 35, wherein
said keys are translucent for back lighting thereof, and said illumination devices are provided by multi-color Light Emitting Diodes (LED); and
said independent illuminating further includes illuminating a respective LED in one color in a first attract sequence corresponding to a first bonus level of the game, and illuminating the respective LED in another color in a second attract sequence corresponding to a second bonus level of the game.
37. A method of attracting potential Players to participate in a networked gaming system comprising:
providing a plurality of gaming devices interconnected through a host computer interconnecting said gaming devices for access to an interconnected game from each gaming device;
providing a plurality of keypad assemblies coupled to a corresponding gaming device, each keypad assembly having a plurality of keys to input data, and a plurality of illumination devices operably coupled to a corresponding key for independent illumination thereof; and
illuminating the illumination devices in a manner visually communicating to a potential Player the current status of the game accessible by said gaming device.
38. The method as defined in claim 37, further including:
before illuminating the illumination devices, communicating the current status of the game from the host computer to a respective microcontroller of each keypad assembly for illumination of the illuminating devices.
39. The method as defined in claim 38, wherein
said current status of said game includes a bonus level of said game.
40. The method as defined in claim 38, further including:
independently illuminating each individual illumination device thereof depending upon the state of the current status.
41. The method as defined in claim 40, wherein

said keys are translucent for back lighting thereof, and said illumination devices are provided by multi-color Light Emitting Diodes (LED); and

said independent illuminating further includes illuminating a respective LED in one color in a first attract sequence corresponding to a first bonus level of the game, and illuminating the respective LED in another color in a second attract sequence corresponding to a second bonus level of the game.

42. The method as defined in claim 41, wherein

said independent illuminating further includes illuminating a respective LED in a third color in a third attract sequence corresponding to a third bonus level of the game.

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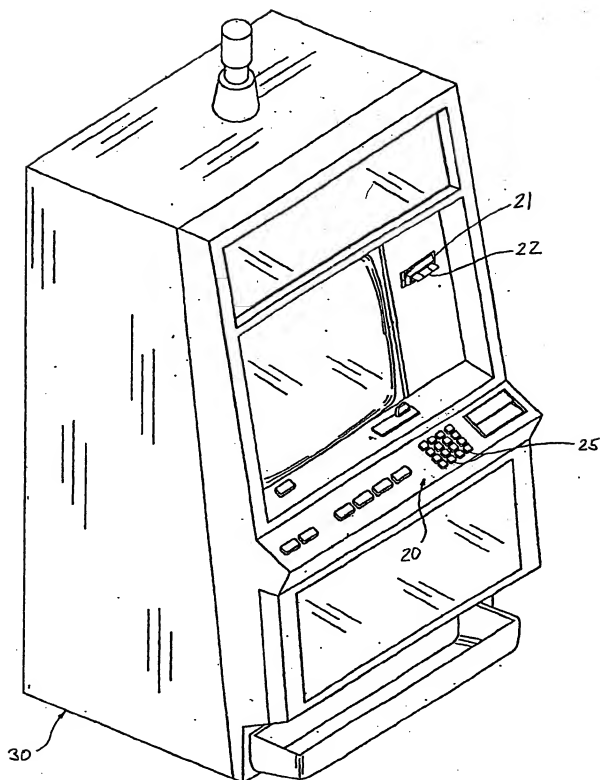


FIG. 1

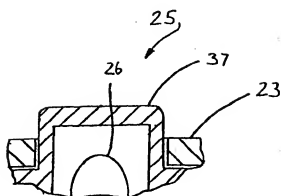


FIG. 6

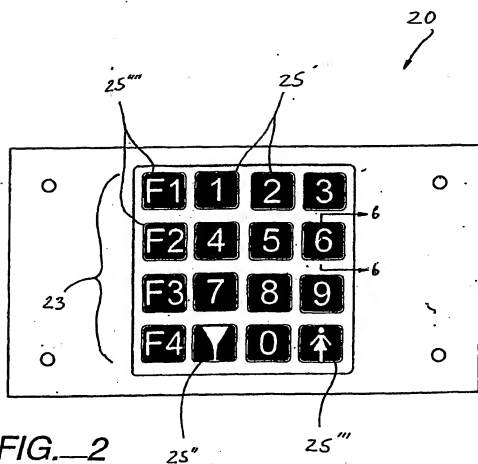


FIG. 2

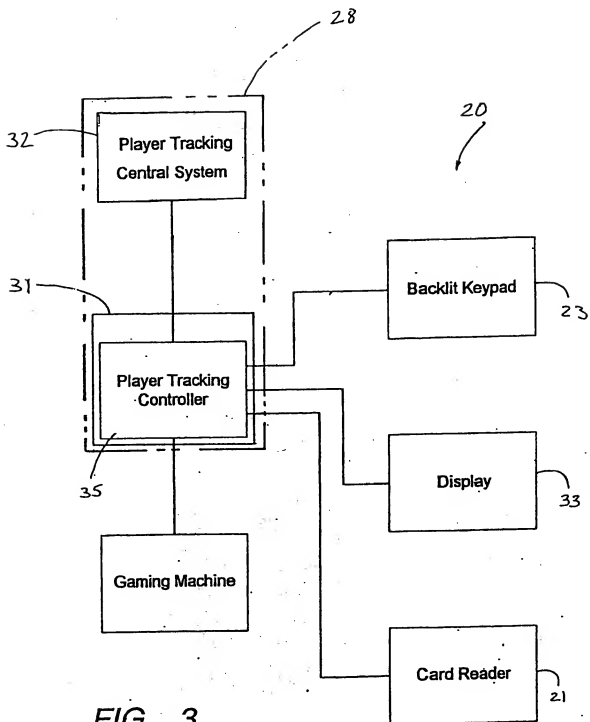


FIG. 3

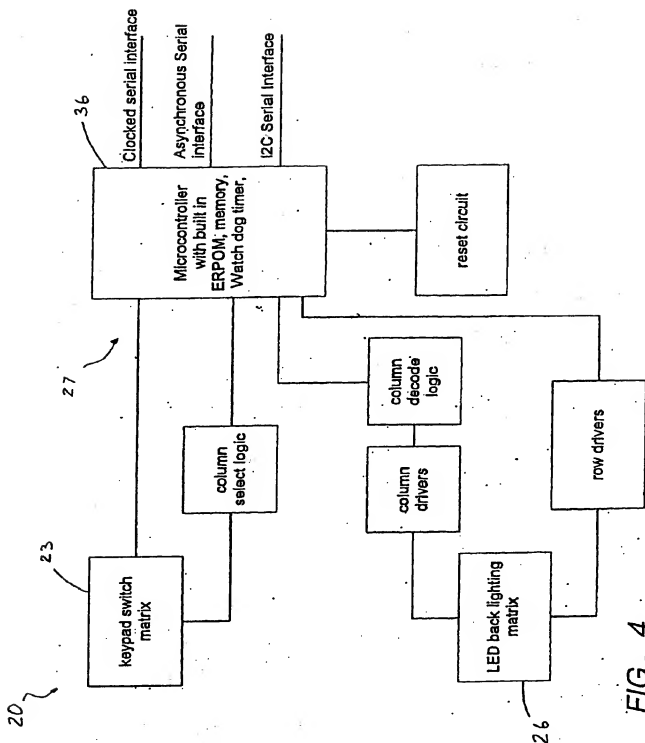


FIG. 4

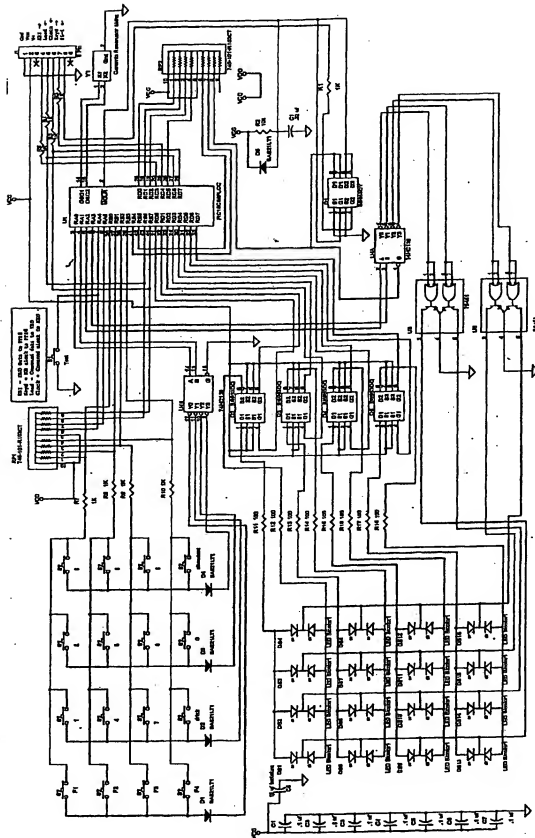


FIG. 5

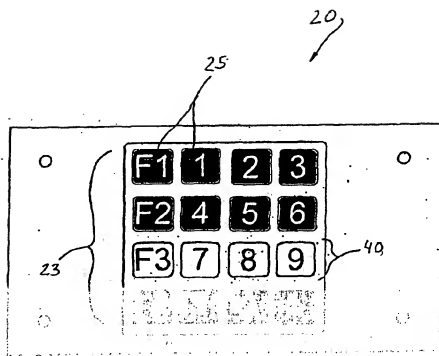


FIG. 7B

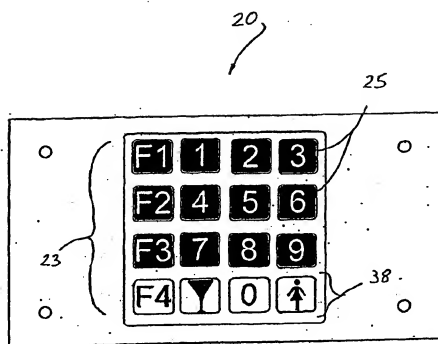
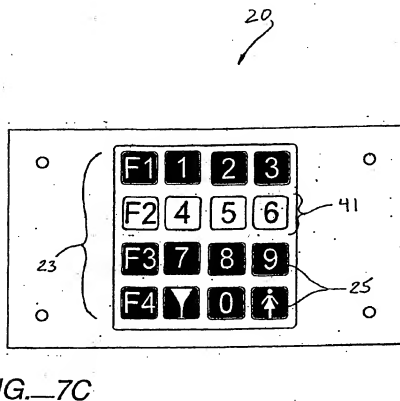
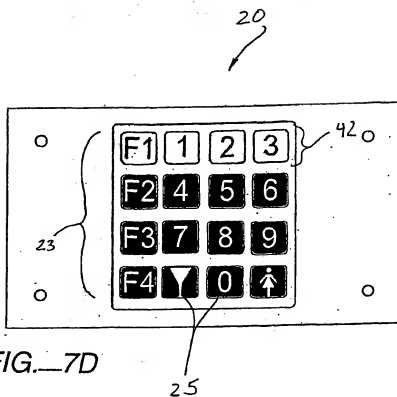


FIG. 7A



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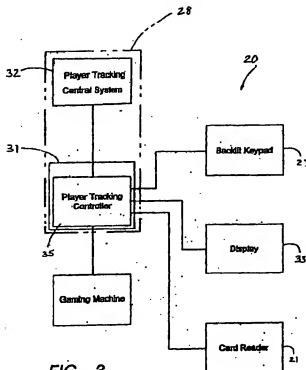
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(54) A microcontrolled backlit keypad assembly and method for a gaming machine

(57) A keypad assembly and method for use with a gaming machine including a keypad having a plurality of keys to input data, and a plurality of illumination devices operably coupled to a corresponding key for inde-

pendent illumination thereof. A microcontroller device is coupled to the plurality of illumination devices for illumination thereof in a manner visually communicating information relating to a game accessible by the gaming machine.

**FIG. 3****EP 1 130 554 A3**



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EUROPEAN SEARCH REPORT

Application Number

EP 01 10 0279

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		28 March 2002	Lindholm, A-M
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X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-verbal disclosure P: intermediate document		T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons S: member of the same patent family, corresponding document	

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